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Key to the known immature stages of Neotropical Tabanidae¹

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Coscarón (2002) published an illustrated key to the larvae and pupae of Argentinian Tabanidae, with notes on the habitat of the larvae. Here we extend that paper to present keys to the known larvae and pupae thus far collected in the Neotropical region, with illustrations. We have not included in the keys some species originally described from the Nearctic region (or whose biology is more or less known), albeit also occurring in the Neotropics. These are *Agkistrocerus aurantiacus* (Bellardi, 1859), *Tabanus abactor* Philip, 1936, *Tabanus dorsifer* Walker, 1860, *Tabanus lineola* Fabricius, 1794, and *Tabanus subsimilis* Bellardi, 1859, even though in the list presented below their respective pertinent references are presented.

Up to now, immature forms have been described of the following Neotropical species.

Subfamily Chrysopsinae

Tribe Chrysopsini

Chrysops dampfi Philip, 1955 – Bermúdez & Bermúdez, 1999: 258, figs. 1A-E
Chrysops facialis Townsend, 1897 – Burger, 1977: 192, figs. 11, 35
Chrysops flavidus Wiedemann, 1821 – Teskey, 1969: 39, fig. 31
Chrysops pachycerus Williston, 1887 – Burger, 1977: 194, figs. 12, 36
Chrysops pachycnemius Hine, 1905 – Bermúdez & Bermúdez, 1999: 259, figs. 2A-D
Chrysops subcaecutiens Bellardi, 1859 – Bermúdez & Bermúdez, 1999: 260, figs. 3A-E
Chrysops variegatus (De Geer, 1776) – Bermúdez & Bermúdez, 1999: 261, figs. 4A-E
Chrysops virgulatus Bellardi, 1859 – Burger, 1977: 195, figs. 13, 37

Subfamily Pangoniinae

Tribe Pangoniini

Esenbeckia (Ricardoia) delta (Hine, 1920) – Burger, 1977: 181, figs. 6, 9
Protodasyapha (Protodasyapha) hirtuosa (Philippi, 1865) – González, 1998: 466, figs. 1-14; Coscarón, 2002: 12, fig. 1F-H (larva), 15, fig. 3C (pupa)

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Tribe Scionini

- Fidena (Laphriomyia) rufopilosa* (Ricardo, 1900) – Zillikens *et al.*, 2005: 381 (larva, pupa, in bromeliad).
Scaptia (Scaptia) lata (Guérin-Méneville, 1835) – Coscarón & González, 1989: 251, figs. 1A-O (larva), 2A-F (pupa);
 Coscarón, 2002: 12, figs. 1B, D-E (larva), 15, figs. 3A-B, 5A (pupa)

Subfamily Tabaninae**Tribe Diachlorini**

- Acanthocera (Polistimima) vespiformis* Burger, 2002 – Burger, 2002: 932, figs. 7-11
Agelanius cortesi (González & Henry, 1996 – González, 2007: 5
Agelanius fuscus González, 2004 – González, 2004a: 211, figs. 1-8
Bolbodimyia atrata (Hine, 1904) – Burger, 1977: 196, figs. 14, 38
Bolbodimyia bermudezi Tidwell & Philip, 1977 – Tidwell & Philip, 1977: 100, figs. 2a-b (pupa)
Catachlorops (Psalidia) baliopterus Gorayeb, Bermúdez, Bermúdez & Villalba, 1989 – Gorayeb *et al.*, 1989: 153, figs.
 4A-E (larva), 154, figs. 5A-D (pupa)
Chlorotabans inanis (Fabricius, 1787) – Coscarón, 2002: 13 (larva), 17 (pupa)
Cryptotylus unicolor (Wiedemann, 1828) – Coscarón & Poi de Neff, 1996: 65, figs. 1-8 (pupa); Coscarón, Mancebo &
 Coscarón Arias, 1998: 91, figs. 1-14 (larva), 15-20 (pupa); Coscarón, 2002: 14, figs. 1M-N, 2M-N (larva), 17, figs.
 3N, 4C (pupa)
Dasybasis (Dasybasis) andicola (Philippi, 1865) – Coscarón, 1991: 10, figs. 1A-H (larva), 2A-E (pupa), 2002: 15, figs.
 2C-F (larva), 19, figs. 3R, 6G (pupa)
Dasybasis (Dasybasis) bruchii (Brèthes, 1910) – González, 2002: 724, figs. 11-14, 15-21
Dasybasis (Dasybasis) canipilis (Kröber, 1934) – Coscarón, 1991: 12, figs. 3A-E (pupa), 2002: 15 (larva), 20, figs. 3S,
 4L, 6H (pupa)
Dasybasis (Dasybasis) chilensis (Macquart, 1838) – Coscarón, 1991: 14, figs. 4A-D (pupa), 2002: 20, fig. 6C (pupa)
Dasybasis (Dasybasis) fairchildi Coscarón & Philip, 1967 – Coscarón & Philip, 1967: 45, figs. 1-15 (larva), 16-24 (pupa),
 Coscarón, 1991: 14, figs. 5A-B (larva), C-F (pupa), 2002: 15 (larva), 20, figs. 4G, 6E (pupa)
Dasybasis (Dasybasis) nigra (Enderlein, 1925) – Coscarón, 1969: 19, figs. 1 (larva), 2 (pupa), 1991: 17, figs. 6A-E (pupa),
 2002: 15 (larva), 19, fig. 4J (pupa)
Dasybasis (Dasybasis) nigrifrons (Philippi, 1865) – González, 2002: 273, figs. 2-4, 5-10
Dasybasis (Dasybasis) opaca (Brèthes, 1910) – Coscarón, 1991: 17, figs. 7A-B (larva), C-G (pupa), 2002: 15, fig. 2B
 (larva), 19, figs. 6A-B (pupa)
Dasybasis (Dasybasis) pruivittata (Kröber, 1934) – González, 2004b: 1, figs. 8A-B (larva), C-J (pupa)
Dasybasis (Dasybasis) testaceomaculata (Macquart, 1838) – Coscarón, 1991: 19, figs. 8A-B (larva), C-J (pupa), 2002:
 15, figs. 2I-J (larva), 20, fig. 6F (pupa)
Lepiselaga (Lepiselaga) crassipes (Fabricius, 1805) – Lutz & Nuñez Tovar, 1928: 63-64 (notes); Fairchild, 1940: 8, pl.
 II, figs. 1-3 (larva), 4-5 (pupa); Goodwin & Murdoch, 1974: 104, 106, figs. 22, 27; Coscarón, Coscarón Arias
 & Mancebo, 1996: 25, figs. 22-25 (larva), 26-32 (pupa); Coscarón, 2002: 13, fig. 1I (larva), 16, figs. 3J, 4B
 (pupa)
Leucotabanus albovarius (Walker, 1857) – Godoi & Rafael, 2007: 102-104, figs. 8-10 (larva), 11-13 (puparium).
Leucotabanus exaestuans (Linnaeus, 1758) – Goodwin & Murdoch, 1974: 105-108, figs. 28A-E
Leucotabanus flavinotum (Kröber, 1934) – Goodwin & Murdoch, 1974: 106, 108, figs. 15, 29
Myiotabanus amazonicus Rafael & Ferreira, 2004 – Rafael & Ferreira, 2004: 326, figs. 11-13 (pupa)
Myiotabanus barrettoi Fairchild, 1971 – Coscarón, Coscarón Arias & Mancebo, 1996: 21, figs. 1-10 (larva), 11-21 (pupa);
 Coscarón, 2002: 13, fig. 1J (larva), 16, figs. 3E, G, 4A (pupa)
Stibasoma (Rhabdotylus) viridiventris (Macquart, 1838) – Goodwin & Murdoch, 1974: 114 (pupa)
Stibasoma (Stibasoma) fulvohirtum (Wiedemann, 1828) – Goodwin & Murdoch, 1974: 114, fig. 33
Stibasoma (Stibasoma) theotaenia (Wiedemann, 1828) – Coscarón, Mancebo & Coscarón Arias, 1999: 619, figs. 6-11,
 12-18; Coscarón, 2002: 14, fig. 1K (larva), 16, figs. 3L-M, 4D (pupa)

Tribe Tabanini

- Agkistrocerus aurantiacus* (Bellardi, 1859) – Burger *et al.*, 1990: 183, figs. 2-11
Poeciloderas quadripunctatus (Fabricius, 1805) – Bermúdez & Bermúdez, 1999: 263, fig. 5; Coscarón, 2002: 17 (pupa)

- Tabanus abactor* Philip, 1936 – Montandon *et al.*, 1993: 61 (larval habitat)
Tabanus atratus Fabricius, 1775 - Walsh, 1865 (larva), Riley, 1870 (larva), Hart, 1895 (larva), Hine, 1906: 33, fig. 10 (pupa), Stone, 1930 (larva), Jamnback & Wall, 1959 (larva), Teskey, 1969: 64, figs. 48, 114 (larva, pupa)
Tabanus boharti Philip, 1950 – Burger, 1977: 219, figs. 22, 26
Tabanus caenosus Burger, 1974 – Burger, 1977: 221, figs. 23, 47
Tabanus claripennis (Bigot, 1892) – Coscarón & Led, 1968b: 13, figs. 4-5 (larva), 6-7 (pupa) ; Coscarón, 2002: 14 (larva), 18, fig. 4E (pupa)
Tabanus dorsifer Walker, 1860 – Roberts, 1962: 436, figs. 1-3 (larva), 4-6 (pupa); Burger, 1977: 226, figs. 25, 49
Tabanus gilanus Townsend, 1897 – Burger, 1977: 228, figs. 26, 50
Tabanus laticornis Hine, 1904 – Burger, 1977: 207, fig. 18
Tabanus lineola Fabricius, 1794 – Hart, 1895; Philip, 1931; Schwardt, 1931: 411-412 (descr. of larva, larval period, number and duration of larval stages), 413 (descr. of pupa, the pupal period); Tashiro, 1950; Jamnback & Hall, 1959; Teskey, 1969: 69, figs. 51, 123 (larva, pupa)
Tabanus morbosus Stone, 1938 – Burger, 1977: 236, figs. 28, 52
Tabanus nebulosus De Geer, 1776 – Coscarón *et al.*, 1998: 96 (as *nebulosus ornativentris* Kröber, 1929), figs. 21-22 (larva), 23-28 (pupa); Coscarón, 2002: 15 (larva), 18, fig. 3P (pupa)
Tabanus nigrovittatus Macquart, 1847 – Teskey, 1969: 72, fig. 58 (larva, pupa)
Tabanus oculus Walker, 1848 – Bermúdez & Bermúdez, 1999: 264, figs. 6A-F
Tabanus platensis Brèthes, 1910 - Coscarón, 1969: 21, fig. 4 (pupa), 2002: 18 (pupa)
Tabanus pruinosus Bigot, 1892 – Burger, 1977: 237, figs. 29, 53
Tabanus punctifer Osten Sacken, 1876 – Burger, 1977: 240, figs. 30, 54
Tabanus pungens Wiedemann, 1828 - Coscarón, 2002: 14 (larva), 18 (pupa) (in key).
Tabanus subsimilis Bellardi, 1859 – Thompson, 1975: 494 (larval habitats)
Tabanus triangulum Wiedemann, 1828 – Coscarón, 1969: 21, fig. 3 (pupa), 2002: 18, fig. 4F (pupa)

Information on the biology, physiology, ecology and epidemiology of adult Tabanidae and their known immature stages was provided by Coscarón & Papavero (2009) and does not need to be repeated here.

Keys are provided below to the known larvae and pupae of Neotropical Tabanidae, as allowed by our present knowledge on the family. It should be noticed that it was not possible to include all species, since for the time being it is impossible to separate some of them by immature features; in those cases, it was only feasible to go down to the generic level.

I. Larvae

1. Respiratory spiracle sessile (Figs 5, 7, 10); abdomen without subcylindric or subovoidal pseudopods, with transverse ridges (Figs. 4, 9); third antennal segment single (Fig. 6) 2
 Respiratory spiracle pedunculate, with an evertible siphon (Figs. 12-17); abdomen with isolated subcylindric or subovoidal pseudopods; third antennal segment with 2 articles (Fig. 18) 4
- 2 (1). Body flattened, reticulated, with a dark greyish coloration (Figs. 4-5); anal segment subtrapezoidal, bordered by several lobes (Figs. 7-8) *Scaptia* Walker, 1850 and *Fidena* Walker, 1850
 Body subcylindrical, with whitish coloration (Fig. 9); anal segment simple, rounded, without lobes (Figs. 10-11) 3
- 3 (2). Spiracle with a large spine (Fig. 11); length 12-13.5 mm ... *Protodasyapha* (*Protodasyapha*) *hirtuosa* (Philippi, 1865)
 Spiracle without spine; length 34-40 mm *Esenbeckia* Rondani, 1863
- 4 (1). Body coloration greenish-grey to brownish-gray, sometimes reticulated, with 3 pairs of pseudopods on abdominal segments II-VII 5
 Body coloration whitish or light greenish, generally with 4 pairs of pseudopods on abdominal segments II-VII 10
- 5 (4). Respiratory siphon elongated, about 2-5 times as long as wide at base and acute apically (Figs. 12-33) 6
 Respiratory siphon relatively short, generally about 1/3 as long as wide and rounded apically (Figs. 13, 15-16, 21, 23, 27-30, 32) 7
- 6 (5). Body covered by microtrichiae, these arranged like a reticulate (Fig. 12); third antennal segment notoriously shorter than the second *Lepiselaga* (*Lepiselaga*) *crassipes* (Fabricius, 1805)

| | |
|---|---|
| Body not as above; third antennal segment as long as or longer than the second | <i>Chrysops</i> Meigen, 1803 |
| 7 (5). Body greenish, with brownish- grayish spots or longitudinal lighter stripes (Fig. 13) | 8 |
| Body homogeneously greenish-grey (Figs. 15-17) | 9 |
| 8 (7). Body with brownish-grey spots dorsolaterally placed (Fig. 13); length 16-18 mm | <i>Myotabanus barrettoi</i> Fairchild, 1971 |
| Body with a lighter band on the pseudopods laterally placed, and without dorsolateral spots; length 28 mm | <i>Chlorotabanus inanis</i> (Fabricius, 1787) |
| 9 (7). Pubescence of notoriously long ciliae arranged in groups (Figs. 2, 15-17, 31-32); dorsal pubescence isolated; mandibles with 21-23 serrulations (Fig. 14) | <i>Cryptotylus unicolor</i> (Wiedemann, 1828) |
| Pubescence with ciliae of normal length, homogeneously arranged; dorsal pseudopods generally arranged like transverse band; mandible with 11-13 serrulations | <i>Stibasoma (Stibasoma) theotaenia</i> (Wiedemann, 1828) |
| 10 (4). Respiratory siphon short, about ½ as long as wide at base | 11 |
| Respiratory siphon generally elongated, sometimes 2 times longer than wide at base (Figs. 27-28) | 18 |
| 11 (10). The entire body segments dorsally covered by pubescence | <i>Bolbodimyia</i> Bigot, 1892 |
| Pubescence confined to the anterior or the posterior margins of segments | 12 |
| 12 (11). First abdominal segments with 3 pairs of pseudopods | <i>Catachlorops</i> Lutz, 1913 |
| First abdominal segments with 2 or 4 pairs of pseudopods | 13 |
| 13 (12). Anal segment apically rounded, with little evident respiratory siphon; pubescence of anal segment forming a complete ring | 14 |
| Anal segment elongated, longer than width of base; pubescence of anal segment not forming a complete ring ... | 15 |
| 14 (13). Pubescence with darker pigmentation and well evident anal ridge, united with posterior annulus of anal segment by extensive midlateral pubescence | <i>Silvius</i> Meigen, 1820 |
| Pubescence with light pigmentation not very evident | <i>Agelanius</i> Rondani, 1863 |
| 15 (13). Body very slender, pointed anteriorly, siphon as long as wide basally | <i>Stenotabanus</i> Lutz, 1913 |
| Body broad, rounded anteriorly; siphon shorter than wide basally (<i>Leucotabanus</i> Lutz, 1913) | 16 |
| 16 (15). Length 19-21 mm; cuticular pubescence present; abdomen with 4 pairs of pseudopods on each segment | 17 |
| Length 42 mm; cuticular pubescence absent; abdomen with 2 pairs of pseudopods on each segment (Figs. 88-90) | <i>Leucotabanus albovarius</i> (Walker, 1857) |
| 17 (16). Cuticular pubescence present on abdominal segments I-V | <i>Leucotabanus exaestuans</i> (Linnaeus, 1758) |
| Cuticular pubescence present on abdominal segments I-II and VII (also rarely on VI) | <i>Leucotabanus flavinotum</i> (Kröber, 1934) |
| 18 (10). With a pair of pseudopods before the anal ring (Figs. 20, 22, 24, 25); dorsal pseudopods of segments II-VII not closely placed, simulating a transversal band (Fig. 19) (<i>Dasybasis</i> Macquart, 1847) | 20 |
| Without pseudopods before the anal ring (Fig. 29); dorsal pseudopods of abdominal segments II-VII very closely placed, simulating a continuous transverse band | 19 |
| 19 (18). Larvae light green | <i>Atylotus</i> Osten Sacken, 1875 |
| Larvae creamy-white | <i>Tabanus</i> Linnaeus, 1758 and <i>Agkistrocerus</i> Philip, 1941 |
| 20 (18). Lateral pubescence of the anal segment occupying almost all the segment, except the medio-dorsal area and a pair of lateral areas (Figs. 27-28) | <i>Dasybasis (Dasybasis) testaceomaculata</i> (Macquart, 1838) |
| Lateral pubescence of the anal segment restricted to one pair of isolated spots (Figs. 20, 23) | 21 |
| 21 (20). Larvae of a greenish tint; anal segment relatively large (length, 2.6 mm, width at base 2.3 mm) (Figs. 21-24) | <i>Dasybasis (Dasybasis) andicola</i> (Philippi, 1865) |
| Larvae of a whitish tint; anal segment relatively short (length, 2.2-2.5 mm, width at base 2.4 mm) (Figs. 19-20) | 22 |
| 22 (21). Third antennal segment 0.66 times width of the second; mandible with 9-10 serrulations; respiratory siphon 1.2 | |

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|---|---|----|
| mm long | <i>Dasybasis (Dasybasis) fairchildi</i> Coscarón & Philip, 1967 | |
| Third antennal segment 0.42-0.46 times width of second; mandible with 10-13 serrulations; respiratory siphon 0.70-1.0 mm long | | 23 |
| 23 (22). Maximum length 14 mm | <i>Dasybasis (Dasybasis) nigra</i> (Enderlein, 1925) | |
| Maximum length 22-28 mm | | 24 |
| 24 (23). Mandible with 13 serrulations; lateral pubescence spots of anal segment relatively wide (Fig. 20); third article of maxillary palpus 0.43-0.55 times width of second | <i>Dasybasis (Dasybasis) opaca</i> (Brèthes, 1910) | |
| Mandible with 10 serrulations; lateral pubescence spots of anal segment relatively subovoidal; third article of maxillary palpus 0.71 width of second | <i>Dasybasis (Dasybasis) canipilis</i> (Kröber, 1934) | |

II. Pupae

| | | |
|---|--|----|
| 1. Crown of last abdominal segment with 2 pairs of tubercles (the ventral pair smaller and emerging from the lateral base of the other pair); abdominal segment II without spines; antennal crests elongated and prominent. Length about 2.5 mm | <i>Esenbeckia</i> Rondani, 1863 | |
| Crown of last abdominal segment with 3 pairs of tubercles; abdominal segment II generally with spines; antennal crests of variable size. Length variable | | 2 |
| 2 (1). Preanal segment with a pair of dorsal, upturned, acuminate tubercles, posteriorly pointed apically (Figs. 69-70); lateral tubercles of crown horizontally directed backwards and about 7 times longer than the dorsal and ventral tubercles; thoracic respiratory peritreme "C" shaped (Fig. 35) | <i>Scaptia (Scaptia)</i> Walker, 1850 | |
| Preanal segment normally without tubercles (if exceptionally present, they are wide and flattened, with the spines of the border directed upwards and backwards and less than 6 times the length of the others, as in Figs. 78-79); thoracic respiratory peritreme generally more open at sides (Figs. 46, 49, 51-54) | | 3 |
| 3 (2). Frontal tubercles and cephalic and thoracic setae very elongated (Fig. 36) | | |
| | <i>Protodasyapha (Protodasyapha) hirtuosa</i> (Philippi, 1865) | |
| Frontal tubercles and cephalic and thoracic tubercles relatively short (Fig 37, 44, 48, 50) | | 4 |
| 4 (3). Tubercles of callus rudimentary, not well evident, fused with the wrinkled cuticle (except in <i>Lepiselaga</i>); clypeus very elongated, almost reaching the level of the apex of leg III | <i>Fidena</i> Walker, 1850 | |
| Callus tubercles well evident, clypeus short, not surpassing level of apex of first leg | | 5 |
| 5 (4). Tubercles of callus with 2 setae each | | 6 |
| Tubercles of callus with 1 seta each | | 7 |
| 6 (5). Antennal sheath anterodorsally curved and surpassing the level of the epicranial suture; abdominal spines uniseriate; preanal segment without dorsolateral comb | <i>Chrysops</i> Meigen, 1803 | |
| Antennal sheath not curved anterodorsally, surpassing or not surpassing the level of the epicranial suture; abdominal spines biseriate; preanal segment with dorsolateral comb | <i>Stenotabanus</i> Lutz, 1913 | |
| 7 (5). Spines of the abdominal segments notoriously elongated, extending over the following segment (Fig. 44); spiracle ridge (protuberance) very high, about 1/5 of cephalothoracic diameter (Fig. 46); trichomes and cephalic setae multibranching (Figs. 45, 58) | <i>Stibasoma (Stibasoma) theotaenia</i> (Wiedemann, 1828) | |
| Spines of abdominal segment rows short, not reaching the posterior rim of segment (Figs. 37, 47-48, 50); trichomes and cephalic setae simple (Figs. 55, 68) | | 8 |
| 8 (7). Preanal combs restricted to a ventral comb | <i>Catachlorops</i> Lutz, 1913 | |
| Preanal combs generally with ventral, lateral and ventrolateral combs | | 9 |
| 9 (8). Lateral preanal combs absent; basal wing-like tubercles with 2 setae each | <i>Silvius</i> Meigen, 1820 | |
| Lateral preanal combs present; basal wing-like tubercles with 1 seta each | | 10 |
| 10 (9). Abdominal tergite I with a row of ventral tubercles or spines between paired setiferous sublateral tubercles | | |

| | | |
|---|---|----|
| | <i>Chlorotabanus</i> Lutz, 1913 | |
| Abdominal tergite I without tubercles and spines between sublateral setae | | 11 |
| 11 (10). Spines of abdominal segments of variable length and thickness (Fig. 37); facial area generally smooth; ventral tubercles of crown small (Figs. 71-74); abdominal spiracles over two times longer than wide at the base (Figs. 39, 42)..... | | 12 |
| Spines of abdominal segments with about the same length and thickness (Figs. 47-48, 50); facial area with rugosities on the callus of the frontal tubercles; ventral tubercles of crown generally well developed (Figs. 75-77); abdominal spiracle about as long as wide (Figs. 47-48, 50)..... | | 15 |
| 12 (11). The area from which the antennal sheath arises is strong inflated | | 13 |
| The area from which the antennal sheath arises is not inflated (Figs. 37, 56) | | 14 |
| 13 (12). Frontal tubercles absent | <i>Bolbodimyia</i> Bigot, 1892 | |
| Frontal tubercles present | <i>Agelanius</i> Rondani, 1863 | |
| 14 (12). Facial area without tubercles of callus (Fig. 56); antennal sheath surpassing epicranial suture (Fig. 56); spines of abdominal sternal rows relatively short and thick (Fig. 43) | <i>Lepiselaga (Lepiselaga) crassipes</i> (Fabricius, 1805) | |
| Facial area with tubercle of callus (Fig. 55); antennal sheath not reaching the epicranial suture rim (Fig. 55); spines of abdominal sternal rows elongated and thin (Fig. 40) | <i>Myiotabanus barrettoii</i> Fairchild, 1971 | |
| 15 (11). Dorsal tubercles of crown smaller than the ventral ones; lateral tubercles segmented and large at the base, becoming thinner on the distal half (<i>Leucotabanus</i> Lutz, 1913) | | 16 |
| Dorsal tubercles of crown larger than the ventral ones; lateral tubercles generally getting gradually thinner to the apex and very thin on the distal third | | 18 |
| 16(15). Length 11-17 mm, antennal ridge with one protuberance; dorsal aster tubercle less than 1/3 of lateral tubercle length | | 17 |
| Length 38.3 mm.; antennal ridge with two protuberances; dorsal aster tubercle lower than 1/3 of lateral tubercle length ... | <i>Leucotabanus albovarius</i> (Walker, 1857) | |
| 17 (16). Dorsal tubercle of aster much reduced, only a knob over base of lateral tubercles | <i>Leucotabanus flavinotum</i> (Kröber, 1934) | |
| Dorsal tubercle of aster evident, appearing as a thin appendage about 1/3 length of lateral tubercles | <i>Leucotabanus exaestuans</i> (Linnaeus, 1758) | |
| 18 (15). Lateral tubercles of crown notoriously thinner and segmented since their base | <i>Pseudacanthocera</i> Lutz & Neiva, 1914 | |
| Lateral tubercles of crown relatively thicker and not segmented | | 19 |
| 19 (18). Peritreme of thoracic spiracles 1.8 mm long, surpassing the thoracic rim level (Fig. 47); cephalic setae undulated (Fig. 57) | <i>Cryptotylus unicolor</i> (Wiedemann, 1828) | |
| Peritreme of thoracic spiracle not longer than 1.5 mm.; cephalic setae generally straight | | 20 |
| 20 (19). Metathorax with 1+1 sublateral setae | <i>Poeciloderas quadripunctatus</i> (Fabricius, 1805) | |
| Metathorax with 2+2 sublateral setae | | 21 |
| 21 (20). Peritreme of thoracic spiracle relatively small, expanded and not wrinkled at base (Figs. 51-54) (<i>Dasybasis</i> Macquart, 1847) | | 22 |
| Peritreme of thoracic spiracle relatively large and wrinkled at the base (Figs. 48-49) | | 23 |
| 22 (21). Dorsal and lateral preanal combs absent or vestigial | <i>Atylotus</i> Osten Sacken, 1875 | |
| Dorsal and/or lateral preanal combs well developed (Figs. 78-79) | <i>Tabanus</i> Linnaeus, 1758 and <i>Agkistrocerus</i> Philip, 1941 | |
| 23 (21). Antennal crests united in their midline (Fig. 68); frontal tubercles and tubercles of vertex not evident; dorsal and ventral tubercles of the crown relatively small (Figs. 80-81), with 0.24 and 0.22 mm of width respectively | <i>Dasybasis (Dasybasis) opaca</i> (Brèthes, 1910) | |

- Antennal crests separated in their midline (Figs. 61-67); frontal tubercles and tubercles of vertex evident; dorsal and ventral tubercles of the crown relatively large (Figs. 82-87), the dorsal ones 0.58-0.53, the ventral ones 0.23-0.46 mm of width 24
- 24 (23). Relatively small species (length 10 mm); frontal tubercles little differentiated on a strongly rugose surface (Fig. 64); tergite of abdominal segment VII with 27 spines *Dasybasis (Dasybasis) nigra* (Enderlein, 1925)
Relatively larger species (length 14-17 mm); frontal tubercles well differentiated, or at least not located on a rugose surface; tergite of abdominal segment VII with 33-58 spines 25
- 25 (24). Antennal sheaths not surpassing epicranial suture (Figs. 66-67); over 47 tergal spines on abdominal segment VII; maximum length of pupa 16-17 mm 26
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- 26 (25). Antennal crests with strong sulci on their median lobes (Fig. 67); frontal tubercles with strong rims, separated at the middle and with a height of 0.16 mm; tergite of abdominal segment VII with 48 tergal spines; dorsolateral tubercles of crown relatively little opened *Dasybasis (Dasybasis) andicola* (Philippi, 1865)
Antennal crests without strong sulci on their median lobes (Fig. 66); frontal tubercles without strong rim, not separated medianly and with a height of 0.08 mm; abdominal segment VII with 58 tergal spines; lateral tubercles of the crown very open (Fig. 87); thoracic spiracle stigma bow-shaped (Fig. 52) *Dasybasis (Dasybasis) canipilis* (Kröber, 1934)
- 27 (25). Tubercles of callus relatively elevated (height 0.24 mm); dorsal and ventral tubercles of the crown relatively robust (length 0.43 mm in and width at base 0.25 mm, and length 0.36-0.45 and width 0.18-0.24 mm, respectively) (Fig. 84) *Dasybasis (Dasybasis) fairchildi* Coscarón & Philip, 1967
Tubercles of callus relatively flat (height 0.11 mm) (Fig. 62); dorsal and ventral tubercles of the crown relatively smaller than the above (length 0.28-0.32 and width at base 0.15-0.17 mm, and length 0.23-0.30 and width 0.20-0.23 mm, respectively) (Figs. 82, 85) 28
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Preanal lateroventral comb of female with 7 + 8 spines; tubercles of crown relatively robust (the dorsal ones 0.32 mm in length and 0.17 mm of width at base, the lateral ones 0.37 mm in length and 0.23 mm in width, and the ventral ones 0.30 mm in length and 0.20 mm in width); lateral tubercles not so robust and less divergent (Fig. 82) *Dasybasis (Dasybasis) chilensis* (Macquart, 1838)

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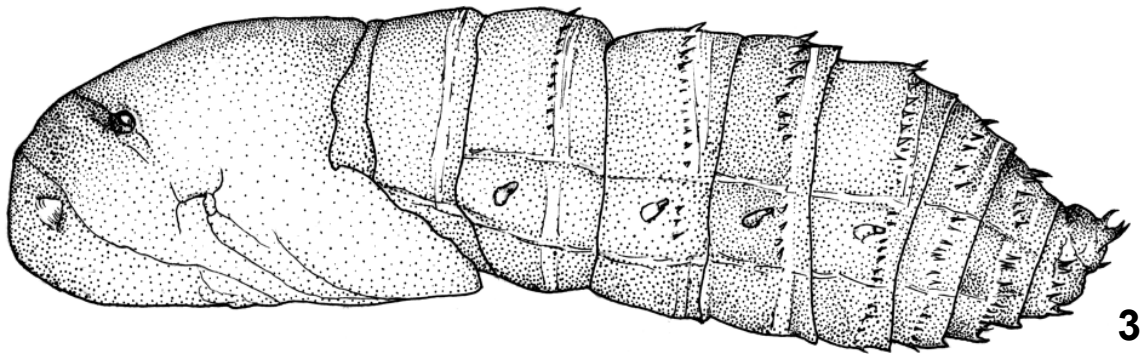
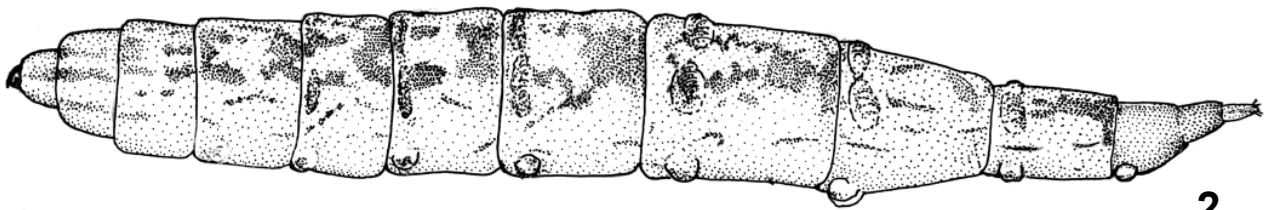
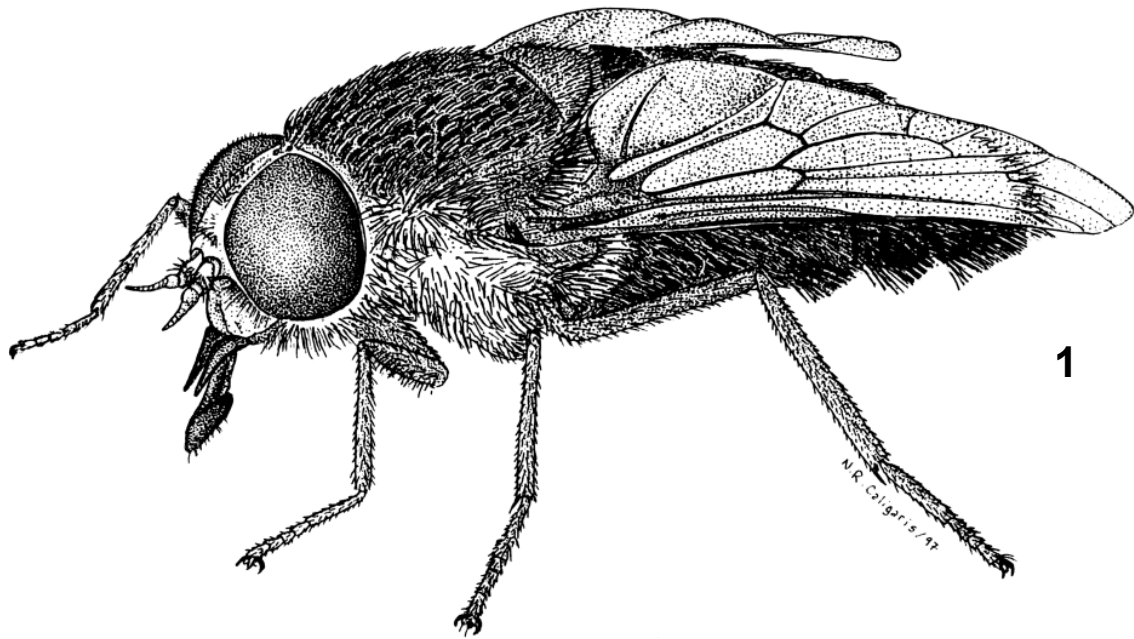
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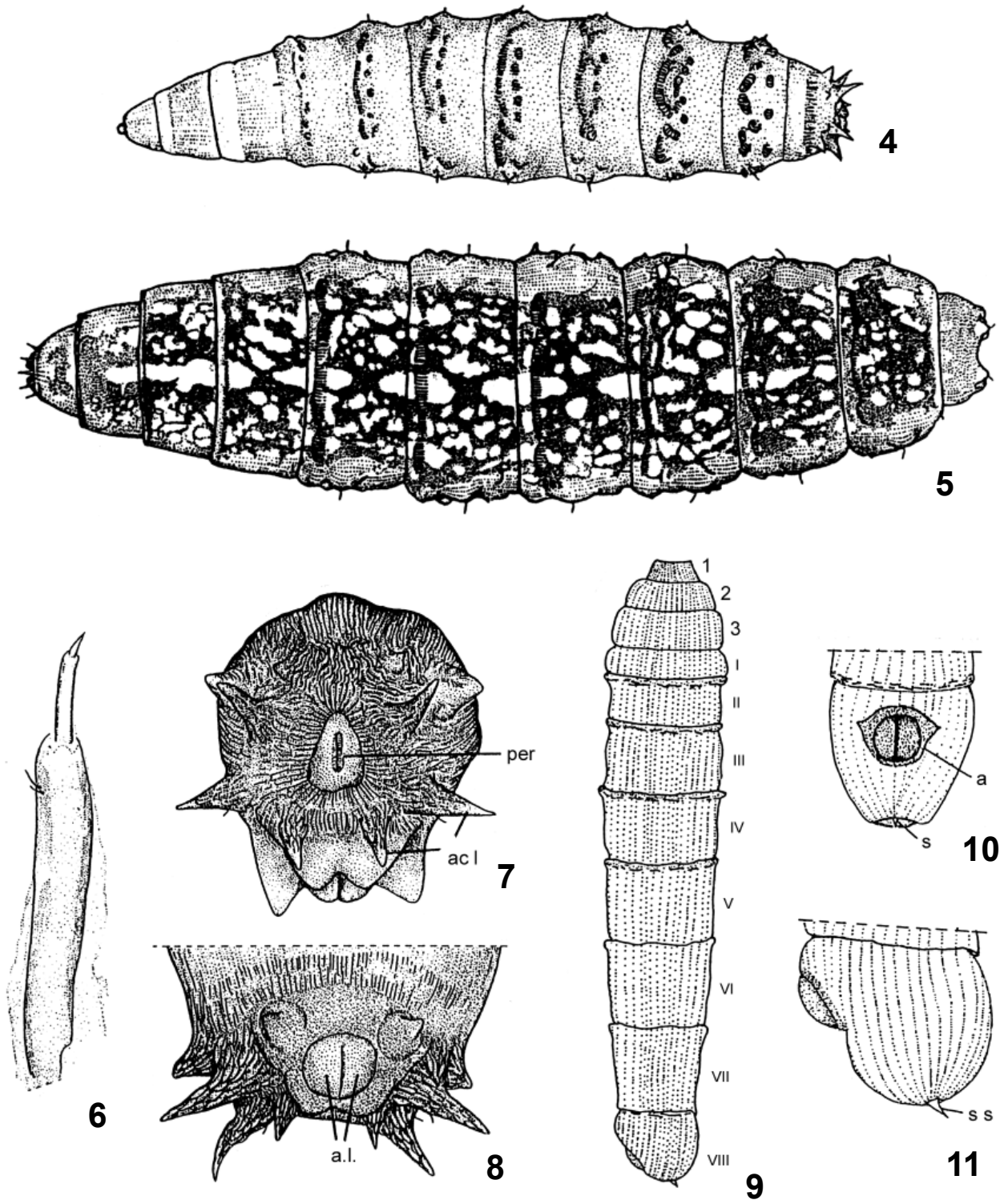
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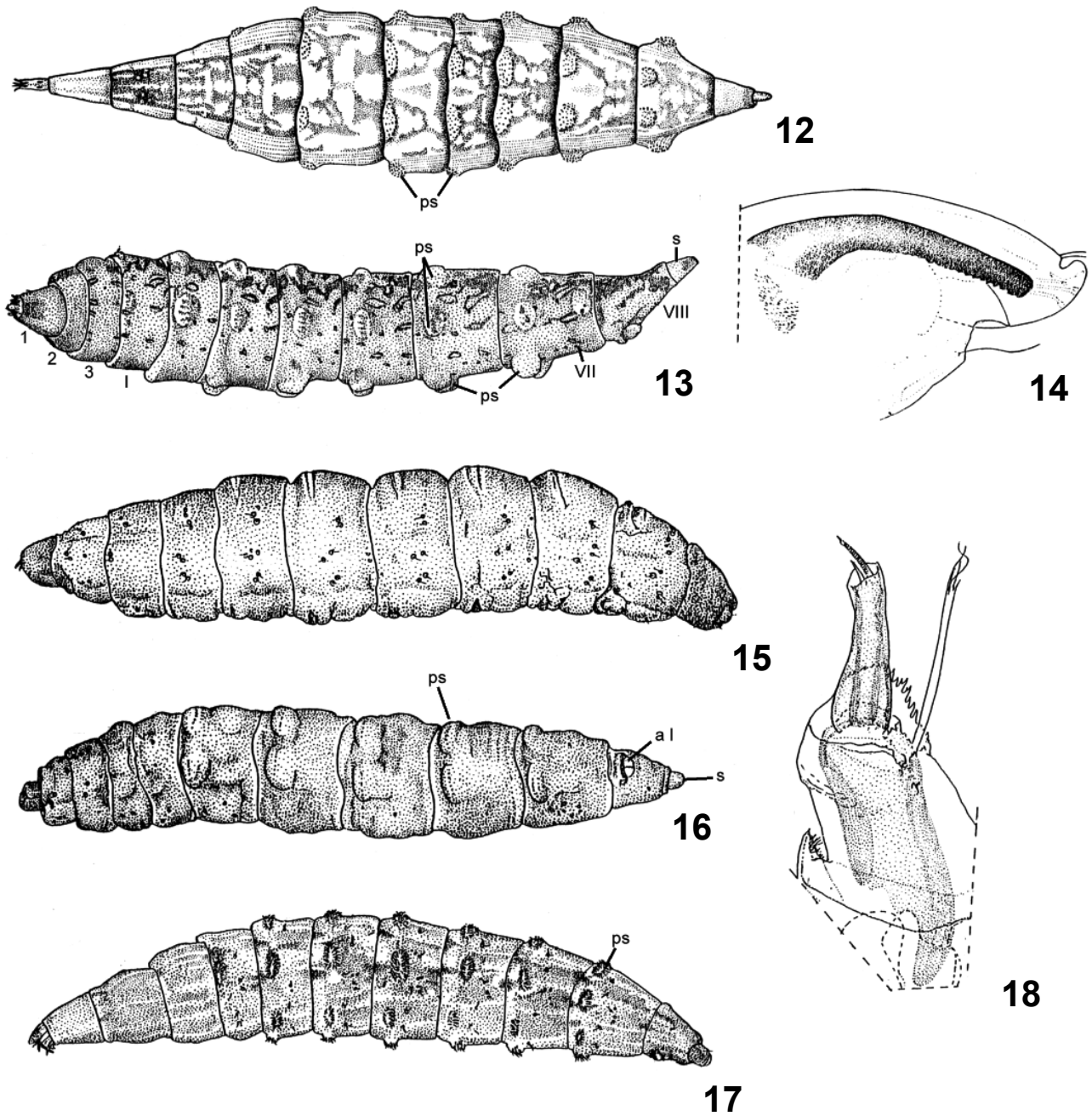
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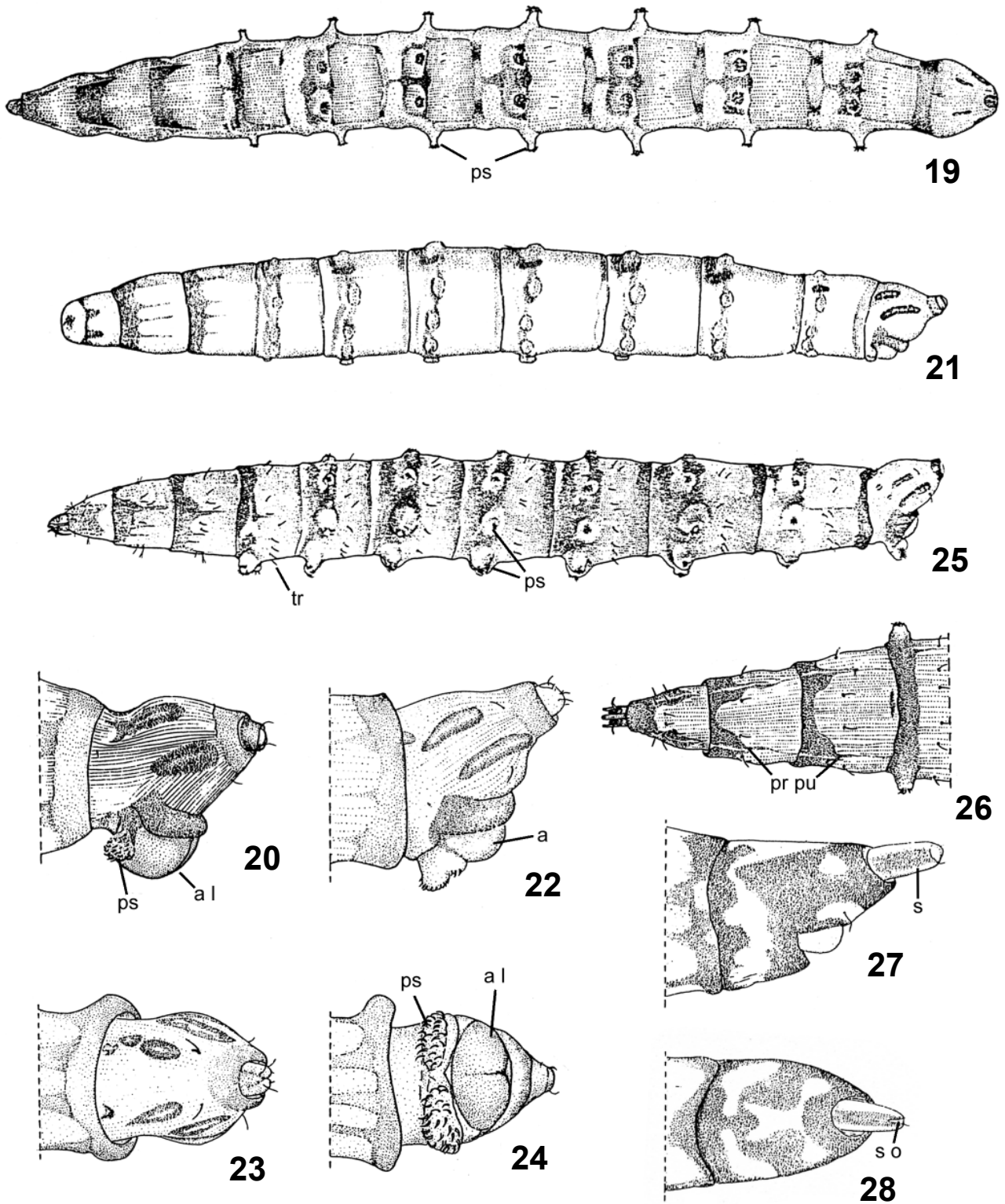
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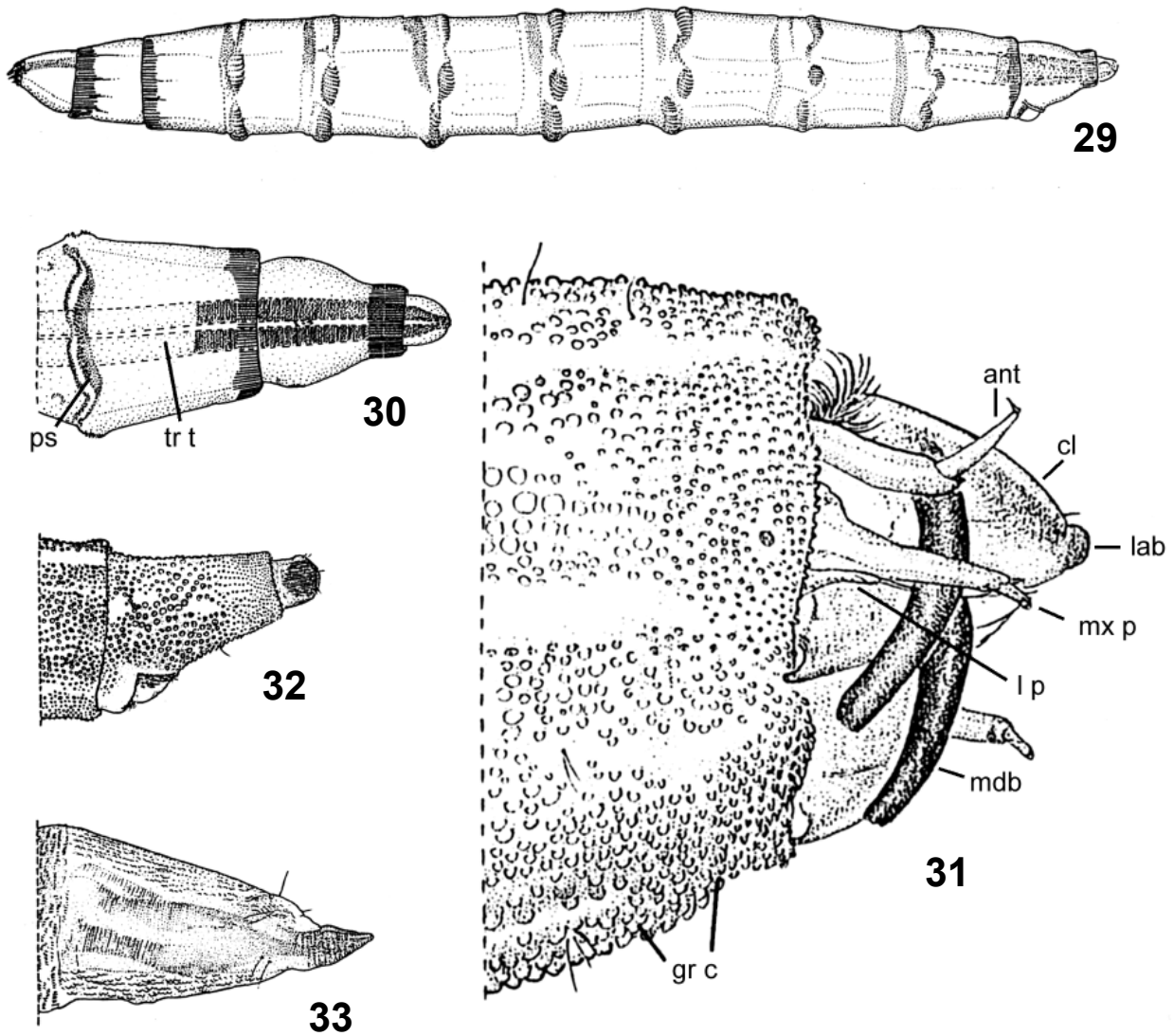
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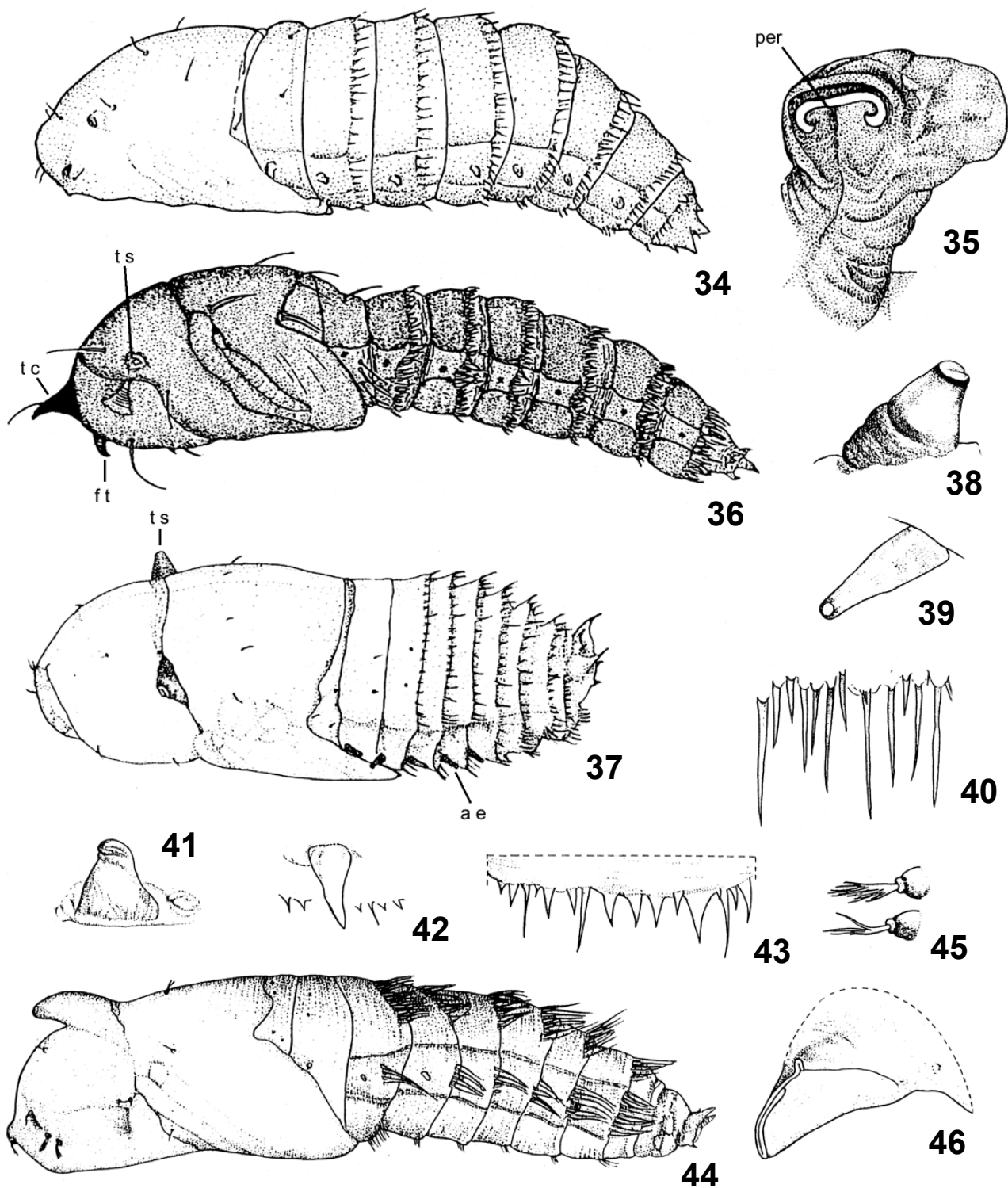
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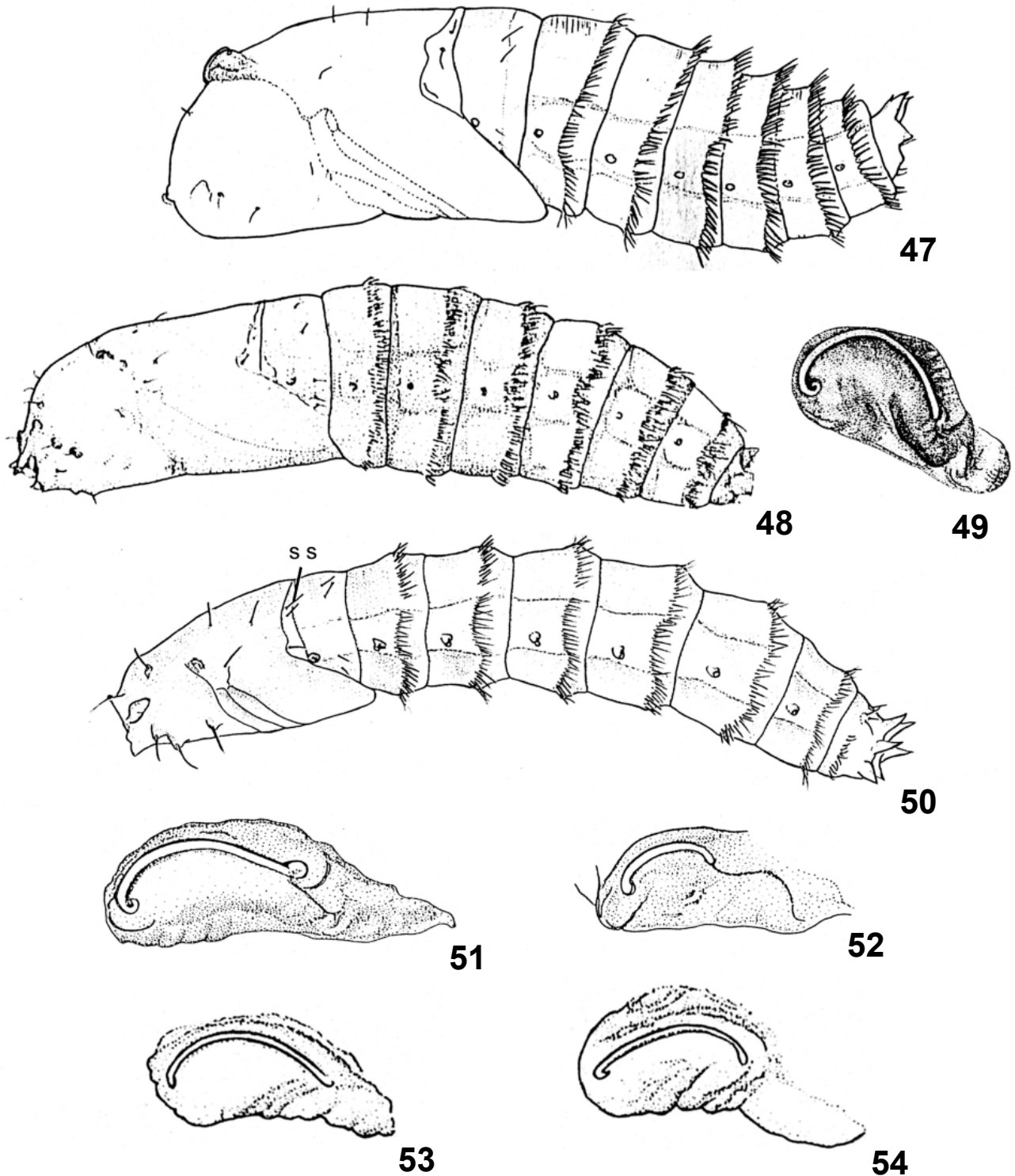
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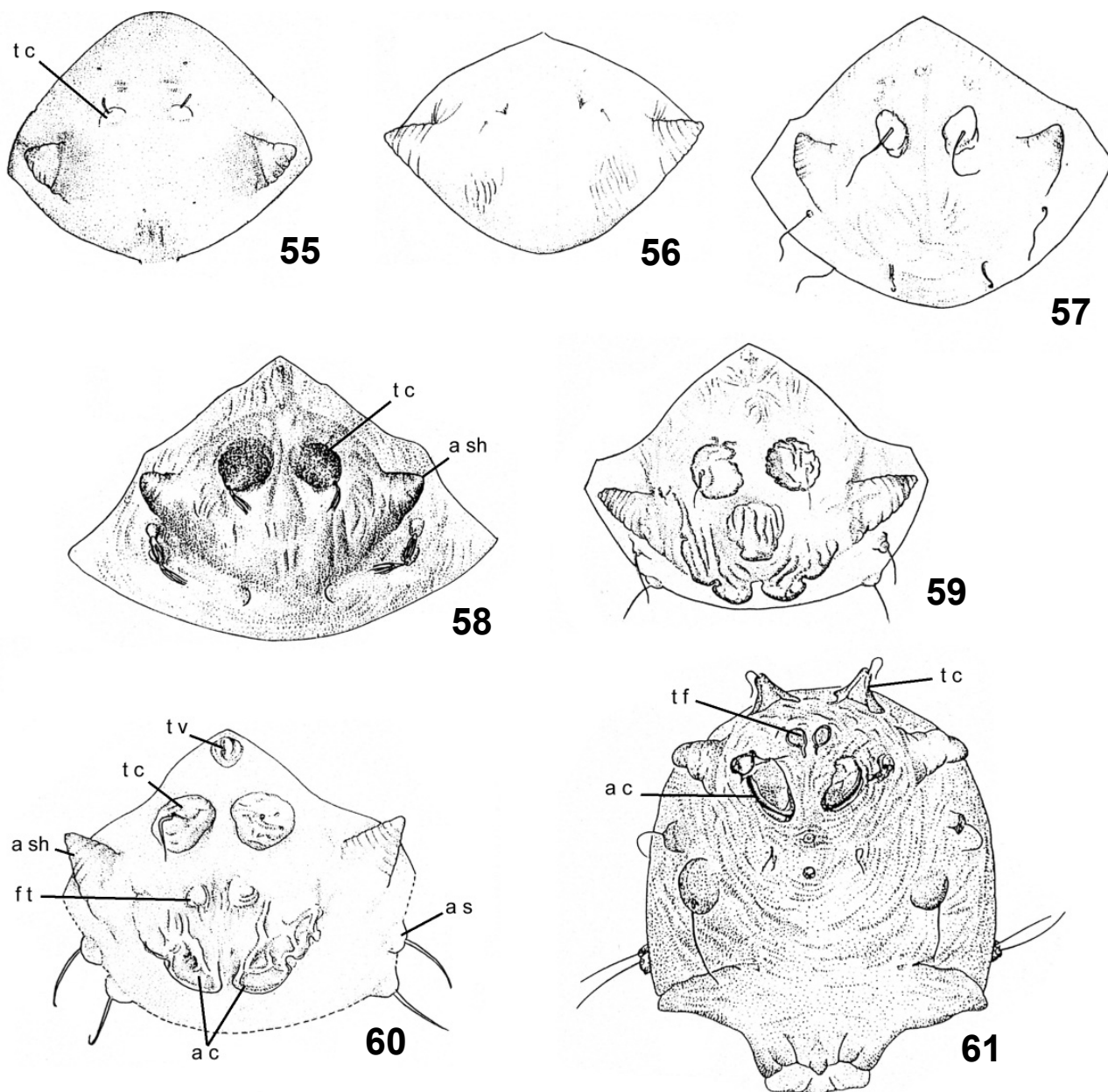
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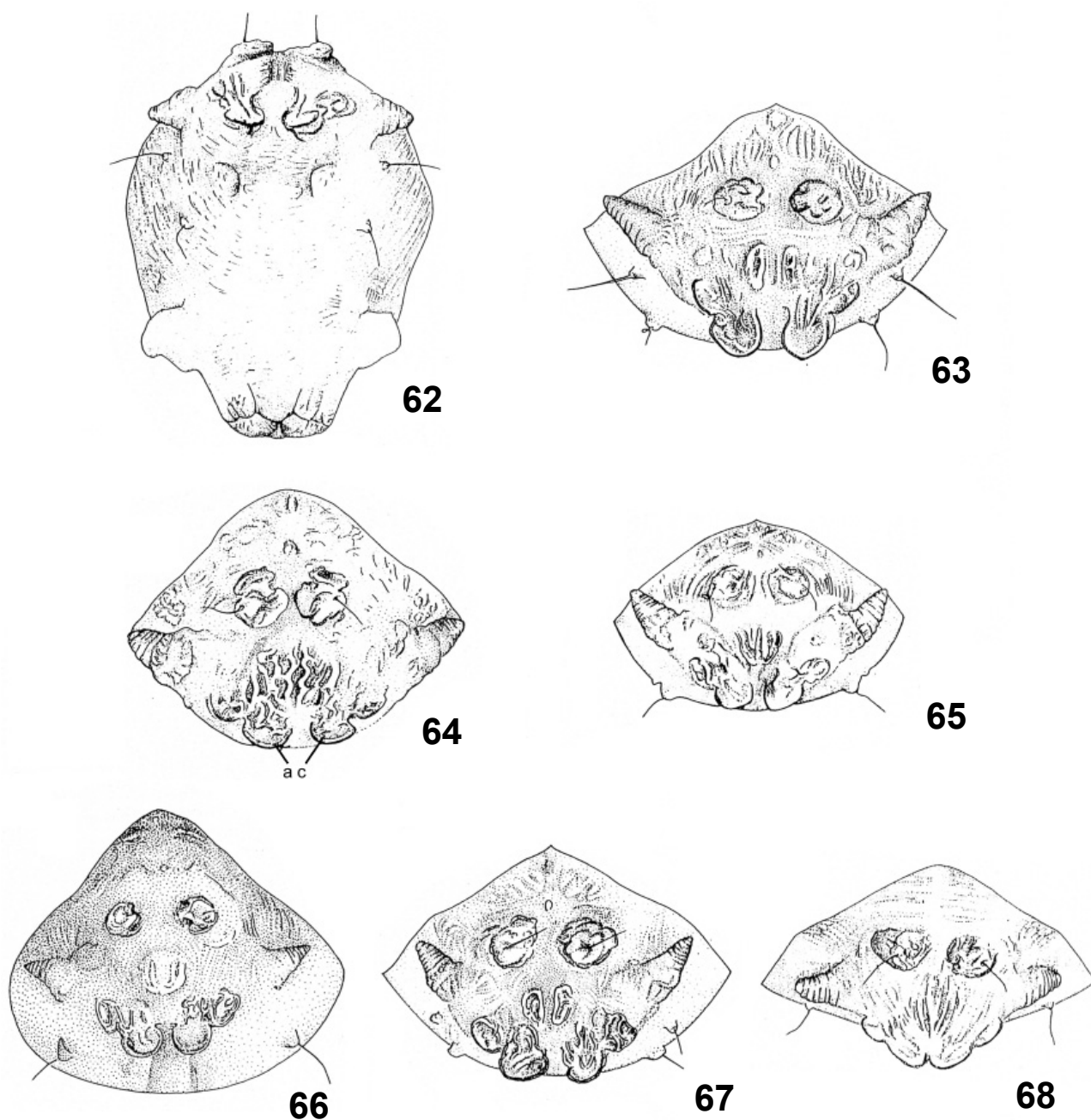
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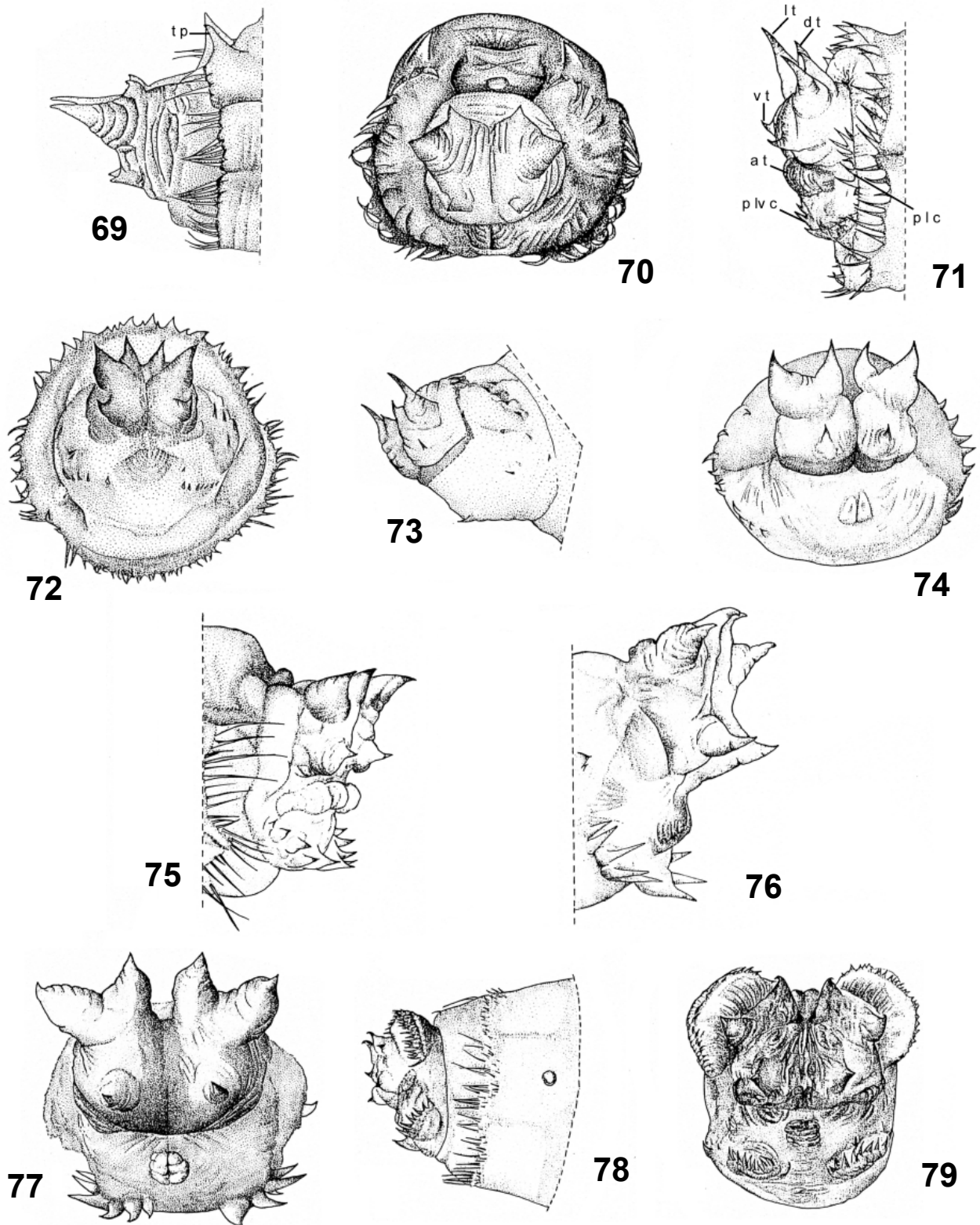
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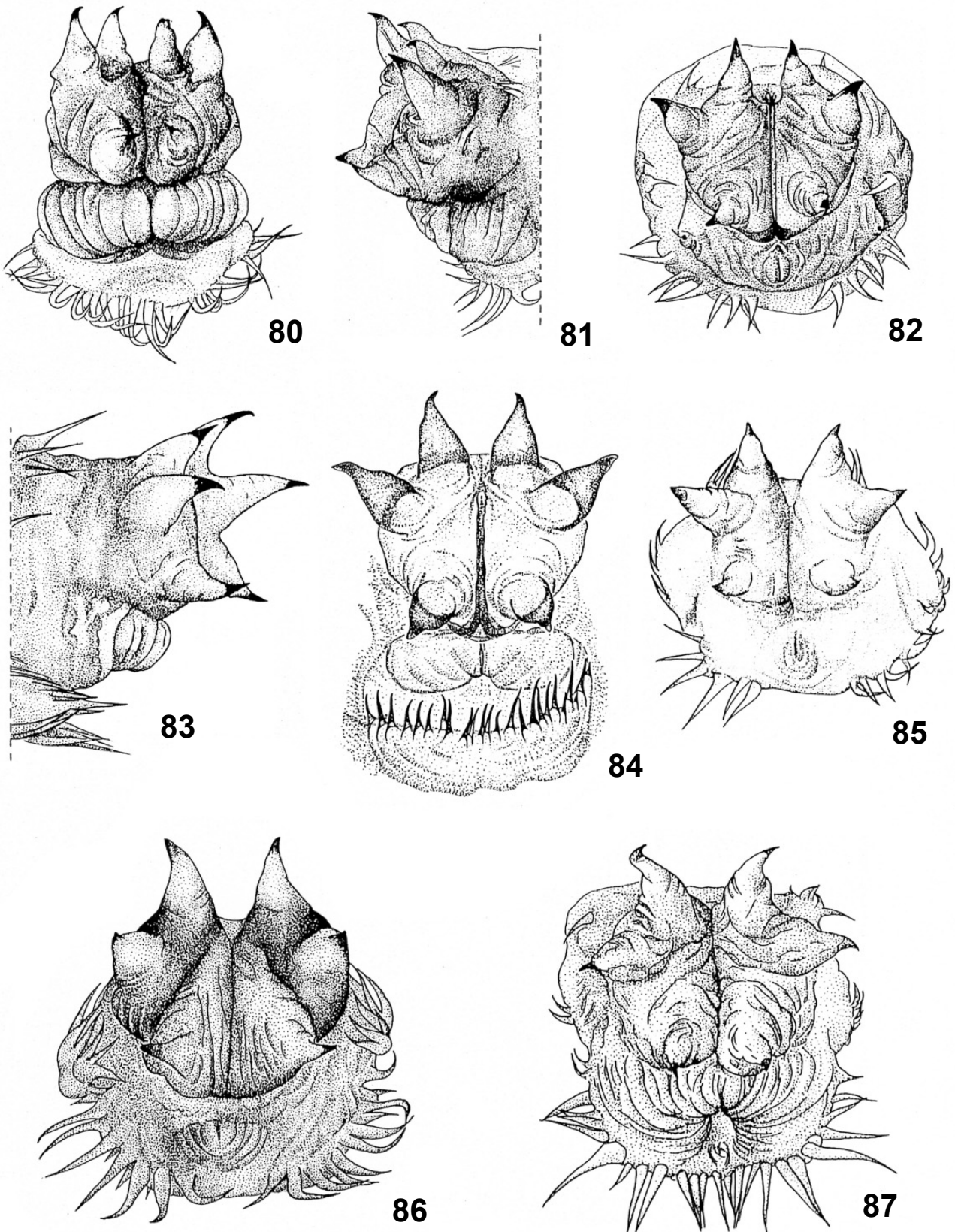
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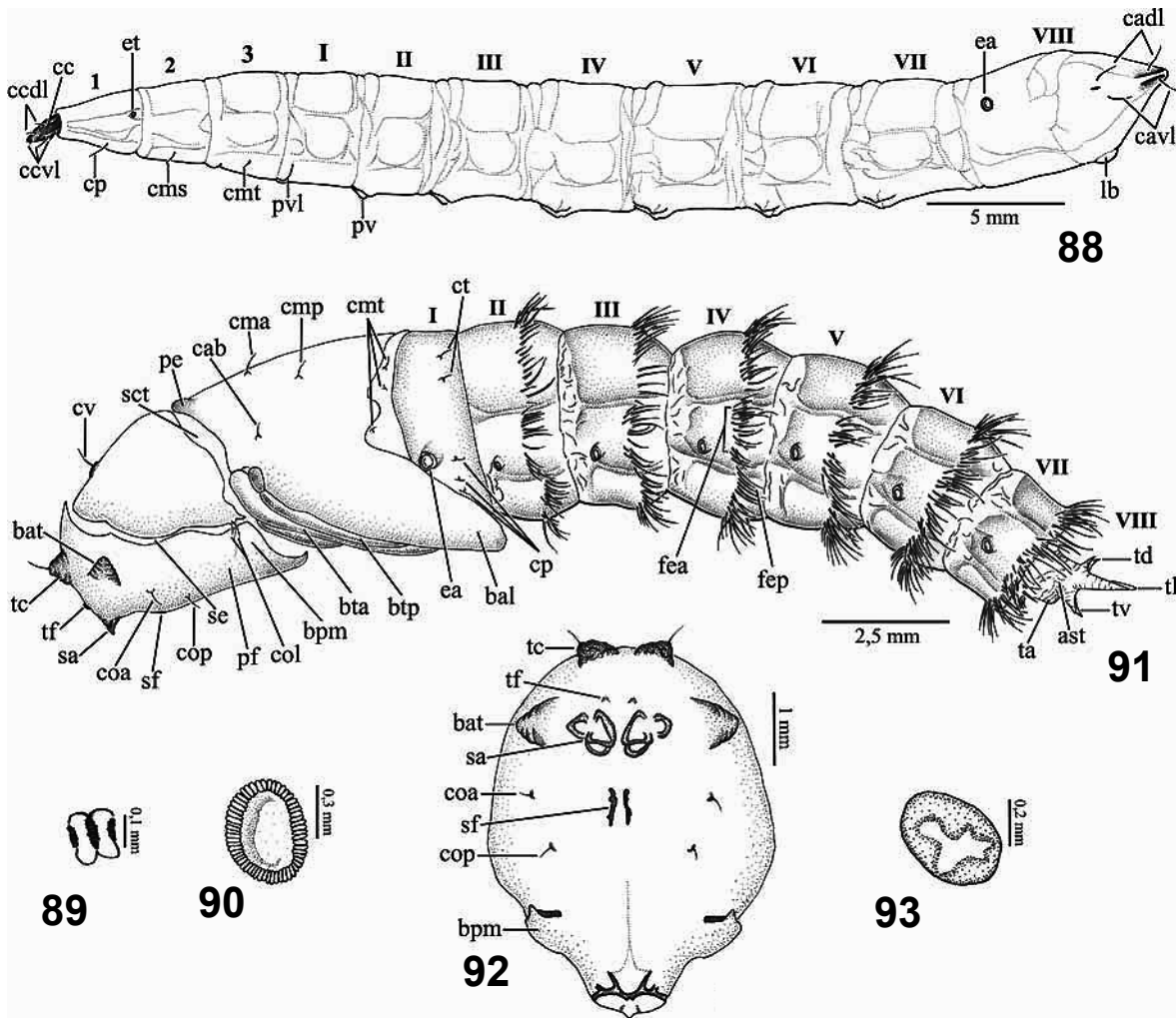
Figures 62-68. Pupae. Frontal plate in ventral view. 62. *Dasybasis (Dasybasis) chilensis* (Macquart, 1838). Frontal plate in dorsal view. 63. *Dasybasis (Dasybasis) chilensis* (Macquart, 1838). 64. *Dasybasis (Dasybasis) nigra* (Enderlein, 1925) (a c = antennal crest). 65. *Dasybasis (Dasybasis) testaceomaculata* (Macquart, 1838). 66. *Dasybasis (Dasybasis) canipilis* (Kröber, 1934). 67. *Dasybasis (Dasybasis) andicola* (Philippi, 1865). 68. *Dasybasis (Dasybasis) opaca* (Brèthes, 1910).



Figures 69-79. Pupae, terminal crown. 69-70. *Scaptia* (*Scaptia*) *lata* (Guérin-Méneville, 1838), lateral and posterior views, respectively (t p = dorsal tubercles of preanal segment). 71-72. *Myiotabanus barrettoii* Fairchild, 1971. 71. Male, lateral view (a t = anal tubercle; d t = dorsal tubercles; p l v = preanal lateral comb; p l v c = preanal lateroventral comb; v t = ventral tubercles). 72. Female, posterior view. 73-74. *Lepiselaga* (*Lepiselaga*) *crassipes* (Fabricius, 1805), female, in lateral and posterior views, respectively. 75. *Tabanus claripennis* (Bigot, 1892), male, lateral view. 76-77. *Tabanus triangulum* (Wiedemann, 1828), female, lateral and posterior views, respectively. 78-79. *Tabanus nebulosus* De Geer, 1776, female, lateral and posterior views, respectively.



Figures 80-87. *Dasybasis*, pupae, terminal crown. 80. *Dasybasis (Dasybasis) opaca* (Brèthes, 1910), male, posterior view. 81. *Dasybasis (Dasybasis) opaca* (Brèthes, 1910), male, lateral view. 82. *Dasybasis (Dasybasis) chilensis* (Macquart, 1838), female. 83. *Dasybasis (Dasybasis) nigra* (Enderlein, 1925), lateral view. 84. *Dasybasis (Dasybasis) faichildi* Coscarón & Philip, 1967, male, posterior view. 85. *Dasybasis (Dasybasis) testaceomaculata* (Macquart, 1838), female, posterior view. 86. *Dasybasis (Dasybasis) andicola* (Philippi, 1865), female, posterior view. 87. *Dasybasis (Dasybasis) canipilis* (Kröber, 1934), male, posterior view.



Figures 88-93. *Leucotabanus albovarius* (Walker, 1857) [Adapted from Godoi & Rafael, 2007: figs. 8-13]. 88. Larva, habitus; 89. Thoracic spiracle of larva; 90. Abdominal spiracle of larva; 91. Puparium, habitus; 92. Puparium, frontal plate, ventral view; 93. Puparium, thoracic spiracle, lateral view. (1-3) thoracic segments; (I-VIII) abdominal segments; (ast) aster; (bal) alar sheath; (bpm) maxillary palpus sheath; (bta) anterior tibial sheath; (btp) posterior tibial sheath; (cab) basal alar bristle; (cadl) dorsolateral abdominal bristles; (cavl) ventrolateral abdominal bristles; (cc) head capsule; (ccdl) dorsolateral cephalic bristles; (ccvl) ventrolateral cephalic bristles; (cms) mesothoracic bristle; (cmt) metathoracic bristle; (cp) prothoracic bristle; (cv) vertical bristle; (cma) anterior mesonotal bristle; (cmp) posterior mesonotal bristle; (cmt) metanotal bristles; (coa) anterior orbital bristle; (col) lateral orbital bristles; (cop) posterior orbital bristle; (cp) pleural bristles; (ct) tergal bristles; (ea) abdominal spiracle; (et) thoracic spiracle; (fea) anterior fringe of spines; (fep) posterior fringe of spines; (lb) anal lobe; (pe) spiracular protuberance; (pf) frontal plate; (ov) ventral pseudopod; (pvl) ventrolateral pseudopod; (sa) antennal salience; (sct) cephalothoracic suture; (se) epicranial suture; (sf) frontal suture; (ta) annal tubercle; (tc) callous tubercle; (td) dorsal tubercle; (tf) frontal tubercle; (tl) lateral tubercle; (tv) ventral tubercle.

